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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------------------|------------------|
| 10/726,968 | 12/02/2003 | Andrew J. Ouderkirk | 59418US002 | 4393 |
| 32692 | 7590 | 09/09/2005 | | |
| 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427 | | | | |
| | | | EXAMINER KEANEY, ELIZABETH MARIE | |
| | | | ART UNIT 2882 | PAPER NUMBER |

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/726,968 | OUDERKIRK ET AL. | |
| | Examiner | Art Unit | |
| | Elizabeth Keaney | 2882 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/24/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4 and 7-14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1,2,4,5,8-10,14,16-19 and 26 of copending Application No. 10/726,995. Although the conflicting claims are not identical, they are not patentably distinct from each other because the first flexible multilayer reflector of 10/726,995 would conform to the layer of phosphor material during manufacture, thereby producing a non-planar flexible multilayer reflector.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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Claims 1-13 and 15-17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6,12-17,20,34,37 and 38 of copending Application No. 10/727026. Although the conflicting claims are not identical, they are not patentably distinct from each other because the non-planar flexible multilayer reflector of application 10/727026 reflects LED light onto the phosphor material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-3 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of copending Application No. 10/727072. Although the conflicting claims are not identical, they are not patentably distinct from each other because the non-planar flexible multilayer reflector of application 10/727072 is positioned to reflect LED light onto the phosphor material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,2,4-7,9 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US Patent 6,155,699; hereinafter Miller) in view of Fleming et al. (US Patent 6,172,810; hereinafter Fleming).

Re claims 1 and 15: Miller discloses, in figures 2 and 3 and throughout the disclosure, a light source, comprising:

- an LED (12) that emits excitation light;
- a layer of phosphor material (36) positioned to receive the excitation light, the phosphor material emitting visible light when illuminated with the excitation light; and
- a non-planar multilayer (32,34) reflector (30) that transmits the excitation light and reflects visible light (column 6, lines 17-18; column 6, line 42),
 - the non-planar multilayer reflector being positioned between the LED and the layer of phosphor material.

Miller further discloses the non-planar multilayer reflector to be a DBR mirror comprised of alternating layers of TiO_2 and SiO_2 .

However, Miller fails to teach or fairly suggest the non-planer multilayer reflector being flexible.

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Fleming teaches the substitution of a flexible polymeric multilayer reflector for that of a reflector comprised of alternating layers of TiO_2 and SiO_2 (column 2, lines 5-8; column 6, lines 21-39; column 8, lines 1-6).

The Examiner notes that the method step of claim 15 merely requires the formation of the structure included in claim 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the reflector of Fleming for that of Miller because it reduces the cost of the reflector when higher refractive indices are unnecessary.

Re claim 2: Fleming discloses the flexible multilayer reflector comprising polymeric material (column 5, line 17).

Re claim 4: Miller discloses the use of a Gallium Nitride (GaN) die (column 5, lines 14-15). Miller further discloses that the GaN die is configured to emit primary light having a peak wavelength in the blue region. The Examiner notes that while Miller only addresses the peak wavelength emitted by the die, other wavelengths are also present, particularly UV rays. Therefore, Miller discloses excitation light comprising UV light.

Re claim 5: Miller discloses the multilayer reflector to have a concave shape (column 5, line 36).

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Re claim 6: Miller discloses the multilayer reflector to have a hemispherical concave shape (column 5, line 38).

Re claim 7: Miller discloses, in figures 2 and 3 and throughout the disclosure, the layer of phosphor material (36) is disposed on the non-planar flexible multilayer reflector (30).

Re claim 9: Fleming discloses the non-planar polymeric material substantially free of inorganic materials (column 7, lines 38-45).

Re claim 16: Fleming discloses shaping a flexible multilayer reflector to form a non-planer flexible multilayer reflector (column 8, lines 1-6).

Re claim 17: Fleming discloses thermoforming a polymeric multilayer reflector to form a non-planar flexible multilayer reflector (column 8, line 5).

Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller and Fleming as applied to claim 1 above, and further in view of Levinson et al. (US Patent 6,653,765; hereinafter Levinson).

Re claim 10: Miller and Fleming teach all the limitations as shown above, including the use of a variety of materials used to form the phosphor layer (Miller; column 6, lines 1-2).

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However, they fail to teach or fairly suggest explicitly using a phosphor material that is a discontinuous layer of phosphor material.

Levinson discloses the use of discontinuous layer of phosphor material within a light emitting device (column 8, lines 40-42).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the phosphor of Levinson within the device disclosed by Miller and Fleming because it allows the use of the minimum amount of phosphor while still converting all the emission light into visible light.

Re claim 11: Levinson discloses the layer of phosphor material being a plurality of dots of phosphor material (column 8, lines 40-42).

Re claim 12: Miller, Fleming and Levinson teach all the limitations as shown above. Levinson further teaches the grain size to be high enough to ensure proper conversion to visible light (column 8, lines 45-47).

However, Levinson fails to explicitly teach the size of the phosphor dots.

One of ordinary skill in the art would recognize the need for dots having an area less than 10000 microns².

It would have been obvious to one of ordinary skill in the art to use dots having an area of less than 10000 microns² within the device disclosed by Miller, Fleming and Levinson because it would provide maximum conversion efficiency while using the minimum amount of material.

Re claim 13: Levinson discloses the plurality of dots comprise phosphor material that emits red, green and blue light when illuminated with excitation light (column 8, lines 18-32).

Re claim 14: Levinson discloses at least a first phosphor dot emits light at a first wavelength and a second phosphor dot emits light at a second wavelength different than the first wavelength (column 8, lines 18-32).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller and Fleming as applied to claim 1 above, and further in view of Weber et al. ("Giant Birefringent Optics in Multilayer Polymer Mirrors"; hereinafter Weber.

Miller and Fleming teach all the limitations as shown above, including a first and second thermoplastic polymer.

However, they fail to teach or fairly suggest at least some of the layers are birefringent.

Weber discloses the use of birefringent layers within a multilayer polymer mirror.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include birefringent layers within the device of Miller and Fleming because the birefringent layers increase the reflectivity of the reflector while the

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incidence angle increases thereby minimizing the amount of excitation light that is reflected back into the device.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller and Fleming as applied to claim 1 above, and further in view of Schrenk (US Patent 5,540,978).

Miller and Fleming teach all the limitations as shown above, including the reflector comprising polymeric material.

However, they fail to teach or fairly suggest a non-planar flexible multilayer reflector that comprises a polymeric material that resists degradation when exposed to U.V. light.

Schrenk discloses the use of a flexible multilayer reflector comprising polymeric material that resists degradation when exposed to U.V. light within a light device (column 2, lines 62-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the multilayer reflector of Schrenk in the device taught by Miller and Fleming because it maximizes the life of the reflector thereby maximizing the life of the device.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

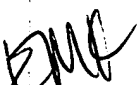
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- US Patent 6,686,676 discloses an LED wherein the phosphor is between the LED and the non-planar reflector layer.
- US Patent 4,882,617 discloses a display device comprising a phosphor layer sandwiched by interference filters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday, Tuesday, Thursday, Friday 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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